THE AMERICAN
JOURNAL OF PHARMACY.

JULY, 1915

WHAT IS RICE POWDER?[1]

By CHARLES H. LAWALL.

If the average purchaser of the toilet powder commonly known as "Rice powder," often labelled "Poudre de Riz" or "Fleur de Riz," were to be asked the question, What is rice powder?, the answer in the majority of cases would be, "Why, rice powder is a powder made from rice."

Not one of the users of the product knows or realizes that for years the greater proportion of brands of toilet powder either labelled directly as rice powder or in a manner implying the presence of rice as a preponderating constituent contain but a small proportion of rice, and many of them contain none at all.

What, then, are the other constituents used in place of rice? Are they harmful? Why this deception in an article which costs so little to put up?

To answer the last question first, I have found no reason for the deception except that it is a matter of custom. The constituents used in place of rice are not harmful; some are cheaper and some are dearer than rice would be; they are chalk, talc, zinc oxide, bismuth subnitrate, and corn starch.

Chalk is a well-known natural mineral substance sold and used in the purified form for various toilet purposes under its own name.

Talc is also a well-known natural mineral substance sold in the purified and perfumed condition under the name talcum or talcum powder.

Zinc oxide is a compound of zinc made by burning the metal and collecting the resulting white powder, which is the oxide. It is used largely in painting and is known as zinc white. It is used in medicine and also sometimes as a cosmetic under its name zinc oxide.

[1] Read at the Meeting of the Pennsylvania Pharmaceutical Association, June, 1915.

Bismuth subnitrate is a chemical compound of a rather uncommon metal known as bismuth. It is frequently used in medicine, and was formerly largely used as a cosmetic under the name of pearl white, but its use for cosmetic purposes has practically disappeared, because it turns black in the presence of sulphur compounds.

Corn starch is the well-known household article of that name.

Rice powder or rice starch is really rice flour made by grinding rice very fine and sifting it through bolting cloth. All of these substances are not always present; some manufacturers use one formula and some another, but I have found, out of sixteen samples examined, all claiming to be rice powder, but two which consisted entirely of the genuine article.

But why does not the Government or the State take cognizance of this condition of affairs under one of the many laws which prohibit adulteration? Because there are no laws prohibiting adulteration except in foods and in drugs. Rice powder sold for cosmetic purposes is not a food, and unless some specific claims of remedial properties are made upon the label it is not legally a drug—therefore it does not fall within scope of the enforcement of any of the "Food and Drug Acts," and, as a matter of fact, neither do most of the toilet soaps and cosmetic preparations, which is the reason for more deception being practised in this line of articles than in any other at the present time.

My attention was first directed to the rice powder frauds—for frauds they undoubtedly are—a few years ago, when one of Philadelphia's most eminent physicians encountered some difficulty in connection with a diagnosis he was making, and in which he felt that the difficulty was due to the use of a face powder containing something other than the rice flour of which the user said it consisted. Examination showed the presence of zinc oxide, talc, and corn starch, no rice being present at all, and further tests showed the disturbing factor in the diagnosis to have been the zinc oxide.

While none of the constituents mentioned are ordinarily harmful, the above instance affords an example of the disadvantages sometimes arising from using a product which is deceptively labelled, as this one was.

Some time ago I read the following paragraph in the *Literary Digest,* which had been copied from *School Science and Mathematics* (Chicago, October):

"For several years occasional cases have come under the obser-

vation of oculists in which the patients, invariably women, complain of vision being blurred, inability to use the eyes for any length of time, and severe itching of the lids. The slightest rubbing of the lids produces a marked redness of the eyes and only aggravates the itching. In severe cases the lids are frequently swollen from constant rubbing. There is a sticky, elastic secretion which, when being removed, pulls out in long strings. Microscopic examination of the secretion reveals masses of what appear to be crystals. Until recently no satisfactory explanation of the presence of these crystals in the eye has been given. Secretion taken from the eyes of two sisters suffering from this peculiar complaint were submitted to the professor of pathology of one of the university medical schools, who found that the crystals came from rice face powder. Seven other patients in whom the same symptoms and microscopic conditions were found all used the same make of a face powder. When the powder is applied to the face with a puff a portion of the fine dust is driven upward and lodges on the moist eyeball. The rice powder in the presence of the tears then becomes mucilaginous in character and is not washed from under the eyelids. The powder produces the irritation, which is aggravated by rubbing. Those who use a chamois-skin in applying the powder are less liable to cause the fine dust to arise, which probably accounts for the condition not being found in every woman using face powder. The condition is quickly relieved by flushing the eye with boric-acid solution. The irritation rapidly disappears when the eyes are kept washed out with a soothing eye-wash."

Although no further explanation is given of the identity of the crystals in the so-called rice powder, I have no hesitation in saying that from my own experience the crystals were undoubtedly those of talc, which is used almost universally in rice powders and in which a microscopic examination usually shows the material to be in the form of broken crystalline fragments, very sharp angled and altogether capable of producing such symptoms as those described.

In consequence of the foregoing experience with the so-called rice powder submitted by the Philadelphia physician I made an investigation of the composition of a number of the different kinds of rice powder sold in Philadelphia. Several of the samples were of purely local origin, many, however, being of national reputation and distribution. It may safely be assumed that the conditions found in Philadelphia could be duplicated anywhere in the United States.

The following is a statement of the results of the examination, together with information concerning the place of purchase, price, and manner of labelling of each, and in some instances the results of correspondence with the seller whose attention had been called to the fraudulent character of the product. The names of brands are purposely withheld as being of no particular benefit, practically all of the samples standing upon the same level in the evident dishonesty attending their labelling and sale. It would seem, from a study of the labels of the products, that a French label is a practical guarantee of adulteration, the only pure samples encountered being labelled simply "Rice powder," with no affectation or frills. "*Poudre de Riz*" is French for rice powder, and "*Fleur de Riz*" is French for the choicest rice, *fleur,* which means flower, being used in a symbolic manner. Indeed, the attitude of manufacturers in general with reference to the adulteration of rice powder is like the grin of the Cheshire cat in "Alice in Wonderland," in which it will be remembered that when Alice expresses surprise that a cat could grin the Red Queen replied, "All of them can and most of them do."

No. 1.—Labelled "Fleur de Riz—much fresher and consequently much superior to the imported." Price, 20 cents for package containing 4 ounces. This sample was purchased in a large drug store. Analysis showed it to consist entirely of corn starch. Attention of the proprietor of the store was called to the dishonesty of the practice, and an immediate reply was received, stating that the product would be changed. That this was done was subsequently verified.

No. 2.—Labelled "Poudre de Riz—Surfine"; claimed to be imported. Price, 20 cents for package containing 4 ounces. This sample was purchased at the same store as No. 1. The same brand was also found for sale at the same price in various other drug and department stores. Analysis showed this sample to consist of rice flour 50 per cent., zinc oxide 10 per cent., and talc 40 per cent.

No. 3.—Labelled "Poudre de Riz—Rice Powder." Price, 20 cents for a package containing 4 ounces. This sample was purchased in a department store. It purported to be manufactured in New York. The composition of this sample was corn starch 17 per cent., chalk 13 per cent., talc 70 per cent. A letter addressed to the firm selling the product was shortly after replied to by the manufacturers, who stated that the package in question had probably been put up by mistake, and that if I returned it they would send me a package of

rice powder. Six months later the same brand, adulterated in the same manner, was still on sale in the same store.

No. 4.—Labelled " Poudre de Riz—Extra Fine." Price, 20 cents for a package containing 4 ounces. This sample was purchased in a department store. It bore the label of a manufacturing company, but gave no address of place of manufacture. Analysis showed it to consist of corn starch 50 per cent., chalk 25 per cent., talc 25 per cent. A letter addressed to the firm selling this product, calling attention to its character, was replied to in a few days with the information that the matter would be immediately taken up and investigated. Six months later the same brand was still on sale with the same composition.

No. 5.—Labelled " Poudre de Riz—Extra Fine." Price, 20 cents for a package containing 4 ounces. This sample was purchased in a department store and was claimed to be their own make. The composition was corn starch 7 per cent., talc 93 per cent. A letter addressed to this store was replied to by a request that I call upon the head of the particular department selling this product concerning the complaint. Upon my suggesting that I would prefer having the head of the department call upon me, nothing further was heard. A few weeks later the packages on sale were noticed to have had the word " compound " added in small letters below the title. Upon asking the demonstrator whether the powder was *pure* rice powder she said " yes," and upon calling her attention to the word " compound " and asking what it meant she said it didn't mean anything in particular, but had to be put on on account of the law.

No. 6.—Labelled " Poudre de Riz—Extra Fine—compound " (the latter word in very small letters). Price, 15 cents for a package containing 4 ounces. This sample was purchased in a department store and claimed to be from a manufacturer who made it especially for them. It bore a floral name. Analysis showed it to contain rice starch 25 per cent., zinc oxide 15 per cent., talc 60 per cent. Two separate letters calling this firm's attention to the character of the product brought no reply. Six months later the same brand was still upon sale of the same composition.

No. 7.—Labelled " Poudre de Riz—Comp." Price, 10 cents for a package containing 4 ounces. This sample was purchased in a 10-cent store. It bore the name of a French manufacturer. The analysis showed rice 18 per cent., chalk 12 per cent., talc 70 per cent.

No. 8.—Labelled " Poudre de Riz—Comp." Price, 25 cents for

a package containing 4 ounces. This sample was purchased in a drug store. It bore the name of a Cincinnati manufacturer. The composition was 75 per cent. talc, 25 per cent. zinc oxide.

No. 9.—Labelled "Poudre de Riz, Fine." Price, 25 cents for a package containing 4 ounces. This sample was purchased in a drug store. It bore the name of a French manufacturer. The composition was talc 7 per cent., zinc oxide 2 per cent., bismuth subnitrate 1 per cent., corn starch 90 per cent.

No. 10.—This was another package of the same brand as sample No. 9, put up in a different shape and style. It showed essentially the same composition as No. 9.

No. 11.—Labelled "Fleur de Riz." Price, 25 cents for a package containing 4 ounces. This sample was purchased in a drug store. It bore the name of a French manufacturer. The composition was talc 27 per cent., corn starch 73 per cent.

No. 12.—This was another package of the same brand as sample No. 11, put up in a package of a different shape and style. It showed the following composition: talc 38 per cent., corn starch 62 per cent.

No. 13.—Labelled "Poudre de Riz de——." Price, 35 cents for a package containing 4 ounces. This sample was purchased in a drug store. It bore the name of a French manufacturer. It has been extensively advertised under the name of "—— Rice Powder." The composition was talc 67 per cent., zinc oxide 33 per cent. No reply was received from the manufacturers to whom a letter was written concerning the deception. Subsequent analysis some months later, showed essentially the same composition, *i.e.*, no rice flour or any other starch, and about 75 per cent. talc and 25 per cent. zinc oxide.

No. 14.—Labelled "Rice Powder." Price, 20 cents for a package containing 4 ounces. This sample was purchased in a drug store. It bore the name of a Philadelphia perfume specialty company. It consisted entirely of rice flour.

No. 15.—Labelled "Rice Powder." Price, 25 cents for a package containing 4 ounces. This sample was purchased by mail from a Western advertising specialty house. It consisted entirely of rice flour.

No. 16.—Labelled "Poudre de Riz." Price, 25 cents for a package containing 4 ounces. This sample was purchased in a drug store and bore the label of a Philadelphia manufacturer. It consisted of rice flour 50 per cent., zinc oxide 25 per cent., talc 25 per cent. A request from the manufacturer for an explanation brought

a reply in which it was stated that "Poudre de Riz" or "Rice powder" simply was a trade name for a powder containing rice as one of its ingredients. Some of the manufacturers may believe this, but the salespeople at the cosmetic counters have never been informed that such is the case, for always upon inquiry the information is forthcoming, "Yes, this rice powder is perfectly pure."

To summarize the results, it will be found that of the sixteen samples examined but two were genuine and only six contained rice starch at all. In eight of the samples corn starch was used in place of the more expensive rice starch, and in two samples no starch of any kind was present, the constituents being wholly of a mineral origin. Talc was present in thirteen out of the sixteen samples.

The wholesale prices of the foregoing materials are approximately as follows:

Rice flour	6	cents a pound
Corn starch	3½	cents a pound
Talc	6	cents a pound
Zinc oxide	2	cents a pound
Chalk	5	cents a pound
* Bismuth subnitrate	$2.75	a pound

*This may be disregarded, as only two samples contained this ingredient, and this only in an amount of 1 per cent.

It will be seen that there is no great difference in the cost of any of the ingredients used, and that, inasmuch as the style of the package is in every case of an inexpensive character, there is no warrant for charging at the rate of from 40 cents to $1 a pound for the mixing and perfuming, which are the only other items of expense.

It is also clearly apparent that there is no justification for the substitution of other ingredients for rice flour when the label gives no clue to their presence.

From the wholesale manner in which toilet powders seem to be used in these days, noses often being so thickly powdered as to resemble marshmallows, it would seem from the consumer's standpoint to be economy to purchase rice flour in a grocery, where, being sold under the provisions of the food law, it is certain to be pure, and to use it in the unperfumed and unadulterated condition. It would commend itself also as tending to reduce the high cost of living.

THE UTILIZATION OF OUR OWN RESOURCES IN PRODUCING DYESTUFFS AND DRUGS.[1]

By Joseph Jacobs, Atlanta, Georgia.

In a paper read at the Baltimore meeting of the American Pharmaceutical Association I endeavored to show how the Southern people supplied the drug necessities to their armies and their non-combatants during the four years of war between the States, while importations were hindered by blockades and home manufactures demoralized by war.

The lessons of self-dependence that were learned and practised by our Southern people during that time in utilizing the many and varied drug resources of our own country, in the absence of the accustomed foreign supplies, apply with similar force now to our whole reunited country, while the world's peaceful trade and intercourse are shattered by the new strife of the European nations.

Owing to our friendly patronage of foreign manufacturers in buying from them many drug products that we could have made for ourselves and many that we could have dispensed with by the use of easily-obtained substitutes, we have found ourselves, after less than a year of their strifes and disputes, distressed to afford the usual supplies of medicinals at reasonable cost to our consumers. It is timely, therefore, it might seem, to learn the cause of these conditions and call attention to the remedies for it which present and pending circumstances seem to indicate.

Our Patent Laws.

If our patent laws had not operated to give unfair advantages to foreign manufacturers of chemicals and dyestuffs over our own we should now be in condition to make on American soil all kinds and quantities of chemical products needed at home and much to sell at a profit abroad. Other nations have required of those desiring patents or trade-marks that factories for the production of the articles involved should be erected on their domains. We have allowed their proprietaries under our patents and trade-marks to produce the articles of their manufacture in their own country without any requirements of their manufacture here. Now, that our for-

[1] From the *Constitution,* Atlanta, Georgia, May 23, 1915.

eign trade is cut off and demoralized by the European war it becomes more and more difficult to supply the usual needs of our people in the drug lines at fair and customary prices, and, as "time grows long," unless wars cease, these conditions will grow worse.

To illustrate present conditions by one of many hundreds of drug articles, a short time ago phenacetine was selling at wholesale in Germany at 20 cents an ounce, in England 24 cents, in Canada 26 cents, and in the United States $1 an ounce. You could buy this article in Canada and bring it to the United States, and under our law it was necessary to pay the difference between 26 cents and $1 to the American representative of the manufacturer. That applied at that time and to-day to such well-known articles as creosotal, aspirin, and many others. German chemists claim superiority for their products, which I do not grant. I believe the firm of Powers-Weightman-Rosengarten Company, of Philadelphia, is in position to manufacture as good chemicals as, if not better than, are made anywhere on earth. A great deal of criticism has been made of American chemists because they have not manufactured dyestuffs. It is granted that coal-tar chemistry has been a special study in Germany, and in that country they excel in this line. At one time we manufactured largely carbolic acid and other preparations now produced nearly exclusively in Germany, but the prices of the foreign article were reduced to such an extent that American chemists could not compete. Their chemists will probably work for 400 marks per month, equivalent to $100 in our money, while our chemists get from two to five times that amount. In underselling American producers it seems to have been their policy to lose money, if necessary; and after that our manufacturers decided to give up, and to use the machinery for something else then to restore prices.

The present war has certainly taught us a few very bitter lessons and would seem to indicate that we should demand of aliens who wish to patent an article or register a trade-mark in this country that they must establish a factory for its production here.

Lesson May Be Profitable.

But, looking beyond the effects of our past unwisdom in failing to establish manufactures of every article of consumption needed by our own people, we may make a virtue out of our present necessities if we will properly use the vast drug resources of our own vales

and forests and which exist so largely in our own soils. A few years ago, on a visit to Mr. Sidney Phelan, at Roberta, Ga., I noticed an enormous amount of peaches going to waste, and wrote an article for the *Constitution* that at a small cost a crusher could be used to utilize the seeds and extract the peach oil. At that time the firm of Jacobs's Pharmacy was importing peach oil from abroad and paying from 25 to 30 cents a pound. The *Constitution* followed this article up with an editorial, but it ended then and there.

The early American practitioners were forced to depend upon native drugs, because of scarcity of foreign supplies. The later generations have been accustomed to receive drugs bearing foreign stamp of approval in use. As facilities for communication with foreign countries are now more highly developed, we have come, unconsciously, to depend upon foreign sources for a large proportion of articles of our materia medica. At the time of this writing supplies are not available to any great extent, and this seems to be a moment when we should turn to our own resources and see what a country with such a wide variation in climatic and soil conditions as the United States can produce. We cannot entirely replace foreign drugs, but we can replace many of them by native drugs, which, for lack of notice, have fallen into disuse. We have reached a point where it is more difficult every day to buy goods, and each day we see evidences of articles that have simply become non-procurable, and, with goods shut off entirely from Germany, this will grow from day to day. Domestic chemicals, too, have become scarce from the unprecedented demand from the other side, and manufacturers in many cases have withdrawn entirely from the market.

A List of Substitutes.

I here append a list of substitutes that were used by druggists and physicians during the war in large quantities, in most of the instances being the only medicines of the kind to be had:

For Columbo, yellow root; for Spanish flies, potato bugs, powdered leaves of butternut; for jalap, wild jalap, wild potato vine, fever root; for aloes, wild jalap, mulberry bark, butternut, dock, wild potato vine, Amer. Colombo; for quinine and Peruvian bark, tulip tree bark, dogwood, cotton-seed tea, chestnut root and bark, chinquapin root and bark, thoroughwort, Spanish oak bark, knob grass, willow bark; for digitalis, blood-root, wild cherry, pipsissewa, bugle

weed, yellow jasmine; for conium, American hemlock; for opium, American hemlock, motherwort; for sarsaparilla, wild sarsaparilla, soapwort, yellow parilla, China briar, queen's delight; for chamomile, dogwood; for flaxseed, watermelon seed; for gum arabic, low mallows, apple, pear and quince gum, balm, watermelon seed; for ergot, cotton root; for guaiacum, boxwood, poke, prickly ash; for ipecac, wild jalap, Carolina hipps; for mezereon, prickly ash; for Kino and catechu, cranesbill; for senna, wild senna; for colocynth, alum root; for tannin, smooth sumac; for olive oil, peanut oil, beechnut oil, cotton-seed oil; for laudanum, hops, motherwort; for acacia, slippery elm bark, sassafras pith; for bougies, slippery elm bark; for corks, blackgum roots, tupelo wood, corncobs; for allspice, spice bush; for assafœtida, wild chamomile; for calomel, dandelion pleurisy root, butterfly weed; for belladonna and hyoscyamus, Jamestown weed; for valerian, lady's slipper; for colchicum, Indian poke.

From various physicians, intelligent ladies and from old Confederate magazines and books and newspapers I have gathered the following data in reference to peculiar and unusual uses of articles that are incident to our trade, that seemed to be of more or less general employment in the South by physicians, druggists and in Confederate households:

Wood anemone was employed as a vesicatory in removing corns from the feet. Powdered mayapple mixed with resin was used as a caustic in treating horses, the farriers using it for escharotic purposes. On farms the juice of the pulp of the maypop juice was made into a summer drink in place of lemonade. Powdered bloodroot, snuffed up the nose, made a powerful sternutatory and was applied as an escharotic to fungous flesh. Pond lily poultice was extensively applied to ulcers. Button snakeroot, or globe flower, was used largely as an expectorant and diuretic. Toothache bark (*Aralia spinosa*) was used to allay pain caused by carious teeth, and in South Carolina the negroes relied on it almost exclusively for rattlesnake bite. Side saddle or flycatcher was used in the various forms of dyspepsia. Ink was made from the rind of the pomegranate fruit, ink balls and copperas, and from poke-berries. Where, during convalescence, an astringent tonic was indicated, dogwood supplied the need. This, with the blackberry and gentians and pipsissewa as tonics and diuretics, and sweetgum and sassafras for mucilaginous and aromatic properties, and wild jalap as a cathartic,

supplied the surgeon in camp with easily procurable medicinal plants, which proved sufficient in many times of need.

The bark of the swamp willow was mixed with tobacco for smoking. Watermelon juice was made into a syrup and the rind into preserves. The seed of the watermelon and those of the gourd were used as a diuretic. Gourd rind was used as mould for buttons. The ladies of St. John's Parish, South Carolina, used prickly pear for hardening tallow in candle-making, one pound to four pounds of tallow, taking the place of wax. The hand-leaved violet formed an emollient application. Red maple made an astringent wash.

In Process of Dyeing.

In the process of dyeing it was found that maple and sweetgum barks, with copperas, made purple; maple, red oak, and copperas, dove color; maple and walnut, brown; sweetgum and copperas, nearly black; peach-tree leaves and alum gave yellow; the artichoke and black oak bark also gave yellow; sassafras root with copperas, a drab; smooth sumac root and bark and berries gave black; black oak bark with a basis of alum gave a bright yellow; with oxide of tin, tints from pale yellow to bright orange; with oxide of iron, a drab; black oak galls in a solution of vitriol made purple, which, as it grows stronger, passed into a black; alum and alder, yellow; hickory bark and copperas, olive; hickory bark and alum, green; white oak and alum, brown; walnut-root and leaves, alone, black; blacksmith's dust was frequently used in place of copperas.

Buckeye lotion was used for gangrenous ulcers, and by some for the toothache.

Among the substitutes for coffee, at home and in camp, the following were a part: Rye, parched okra seeds, cotton seed, parched sweet potatoes, parched corn hominy, peanuts.

Cotton-seed decoction was used for inflammation in mucous passages. The roots of the cotton plant were employed in asthma, and by the negroes as an abortant. Soap was made from cotton seed by treating them direct with lye.

Among the substitutes for tea were *Ceanothus americanus,* known as red root, or New Jersey tea, and holly leaves and blackberry and raspberry leaves and rose leaves.

The *Amelia Azedarach* (Chinaberry) furnished some valuable uses. The ripe berries were employed in making whiskey; the bark of

the root used as an anthelmintic. The leaves were said to prevent "botts" in horses, and were used to pack with dried fruits to preserve them from ravages of insects. A soap was made from the berries, called "poor man's soap."

The ox-eyed daisy was used in place of Persian insect powder—an insecticide used as far back as 1857. In the country, fresh elderberry leaves were laid near the head of a bed-ridden person to keep away flies.

Some Common Remedies.

It was quite an industry, I was told by an Atlanta lady, Mrs. Marcus A. Bell, for the country people to raise castor oil beans. The crushed beans were boiled and the oil skimmed off. She said that the grandmothers of those days revived the traditions of colonial times. They made their own dyes and coloring matters from the roots and barks of native woods. Dogwood, sumac, and the roots of pine trees were largely used, and indigo was cultivated in the gardens. Instead of paregoric, fennel-seed tea was given to babies. For rash they used red-oak bark and alum. Goose grease and sorghum, or honey, was a standard remedy for croup, backed up with turpentine and brown sugar. Sassafras tea was given in the spring and fall as a blood medicine. Adults' colds were doctored with horsemint tea and tea from the roots of broom-sedge. For eruptions and impure blood, spice-wood tea was given. Wine was made from the berries of the elder bush. For diarrhœa, roots of blackberry and blackberry cordial; and so, also, was a tea made from the leaves of the rose geranium. Mutton suet, sweetgum, and the buds of the balm of Gilead were a standard salve for all cuts and sores. Balsam cucumber was widely used as a tonic, and was considered a specific remedy in burns. Catnip, elecampane, and comfrey root and pennyroyal were in every good housewife's pantry, in which, also, was the indispensable string of red peppers, a bag of sage leaves and of "balm." Calamus root for colic in babies was a common dose. The best known standard Georgia tonic was dogwood, poplar, and wild-cherry barks, equal proportions, chipped fine and put in whiskey and taken a wineglassful at meal times; it is still used in large quantities from "Yamacraw to Nickajack." In hemorrhages, black haw root was commonly used. All the white mustard they had was raised in their gardens.

Interviewing one of our old Confederate surgeons, he said:

"During the early part of the war I was placed in charge of a railroad hospital in a small town where it was difficult to obtain medicine at almost any cost, and as I had my little hospital crowded nearly all the time, both with employees of the road, and wounded and sick soldiers, afflicted with various diseases and all kinds of wounds and injuries, and being also engaged in general practice, it naturally followed that my mind was severely taxed in order to supply remedies and substitutes to meet the demands of such varied practice. I perused my dispensary and called into requisition an old botanic practice that had been handed down as a relic of the past, but from which I confess to have received valuable aid and very many useful hints in regard to the medical virtues of our native plants. I give you the following facts from a record I kept of the patients treated, and the remedies I used, and the principal substances I resorted to:

"Of that large class of medicines, so useful in surgery and so much in demand in war times, called antiseptics, most of them, I may say, have been discovered and appropriated to surgical use since our war. In fact, I had but little else at my command except the cold-water dressing for wounds. From experiment I learned to improve on the plain old method, as I think, by employing a decoction of red oak bark added to the water, which acted as a disinfectant, and by its stimulating and astringent properties promoted the healing process. I also used a weak solution of bicarbonate of soda, which I found beneficial in the suppurative stages. When emollients were indicated, I used slippery elm bark and wahoo-root bark, and solution of common salt often helped. In case of great pain I employed poppy heads, nightshade, and stramonium (Jimson weed).

For Intermittent Fever.

"I had a number of cases of intermittent fever. I would give strong boneset tea, warm, and until free vomiting was produced, and as a substitute for quinine, I used, during the intermissions, butterfly root or pleurisy root tea, which would nearly always cut short the febrile state.

"Remittent or bilious fevers were treated much the same way, except that I invariably gave good doses of mandrake tea in the beginning. White ash root or prickly ash root were often given in these fevers to advantage, using always the butterfly root tea in the febrile stage. Virginia snake root, yellow root, or Sampson's snake

root, acted nearly as well, but I preferred the other. If I could have obtained blue mass or calomel I would have begun treatment with a dose or two of that, but none was to be had.

"Mayapple root or peach-tree leaves made into a strong tea and drunk warm would act on the bowels as certainly as senna, but with children, where too much tea is not desirable, I often gave beef's feet oil, hog's feet oil, or even lard heated with syrup.

"In cases of pneumonia, pleurisy, catarrhal fevers, etc., I made local applications of mustard seed or leaves, stramonium leaves, hickory leaves, pepper, etc., warm, and gave alternately butterfly root and sanguinaria, and continued to slightly nauseating, from day to day (no need of anything else). The two last remedies took the place of Dover's powder, quinine, and all other diaphoretics, febrifuges, and arterial sedatives.

"Phytolacca or poke was another favorite remedy, the tincture, when alcohol or whiskey could be obtained; otherwise, tea of root or berries. I used it in all cases of chronic rheumatism or neuralgia, enlarged glands, scrofula, syphilis, and all cases requiring alteratives, often combining with American sarsaparilla root, sassafras, alder, and prickly ash.

"Female complaints gave me some trouble, but I soon learned the use of black haw, squaw weed, partridge berry, etc. I had been taught in the old text-books that opiates in large doses would control some cases of threatened abortion, when the patient had not lost too much from hemorrhage. I found that the black haw root tea would absolutely stop this tendency, not only in cases where there was but little hemorrhage, but where large quantities had passed, and would relieve the most severe cases of dysmenorrhœa, especially when combined with squaw weed, partridge berry, or red shank.

Substitutes for Opiates and Astringents.

"In stomach and bowel diseases I found but little difficulty in obtaining plenty of substitutes for opiates, astringents, and the like; in fact, I believe that an All-wise Providence has especially provided the best antidotes in creation on the hills and dales and by the vales and streams of our own Southland. In ordinary looseness of bowels or diarrhœa I gave an infusion of raspberry leaves or whortleberry leaves (both of which act well on the kidneys and bladder). Where there was a nausea or sick stomach, a handful of peach-tree leaves

steeped in water and drunk will settle it, or, what is perhaps better, the kernels of two or three seeds cracked and cold water drunk off them. If stronger astringent is needed, the inner bark of red oak, blackberry or dewberry root tea, or red shank root, are sure remedies.

"Agrimony tea, and, as a last resort, the nut gall or inkball made into what, from its color, I called black wash (made by squeezing the juice out and adding a little copperas). This black wash is not only a splendid ink, but is a destroyer of venereal sores, warts, corns, ringworm and old ulcers, and excrescences of nearly every kind, much superior to lime water and calomel. Weakened properly, it is good in obstinate bowel diseases and can be used as an injection in gonorrhœa, gleet, etc. Silk weed root, put in whiskey and drunk, giving at the same time pills of rosin from the pine tree, with very small pieces of blue vitriol, will cure obstinate cases of bladder troubles, and is a substitute for copaiba, cubebs, etc.

"I raised lobelia from the seed, and found it to be a reliable emetic, useful in cough medicines, croup, and asthma. I have relieved asthma with lobelia and by smoking stramonium leaves. We, of course, used turpentine as an adjunct in all cases where indicated, which is the case in very many diseases, and in many a positive curative agent.

"Onions and garlic were useful as poultices in nearly all glandular enlargement, as are also poke-root, celery, pepper, parsley, sage, thyme, rue and other garden products. Many of the latter were used for diseases of women and children.

"White sumac, red elm, prickly ash and poke will, in connection with my black wash, cure recent cases of syphilis. It will also cure many cases of chronic rheumatism. Peach-tree leaves and Sampson's snake root will cure most cases of incipient dyspepsia. Gargle made of sage and honey will cure most cases of sore throat, tonsillitis.

"For infants, calamus, catnip and soot teas are better than soothing syrup with opiates."

Nearly every old practitioner in the South to-day is full of such reminiscences as the foregoing.

Our American people have every resource of material and intelligence to supply their own needs in drugs and every other kind of manufacture, and need only to "look around" them with the spirit and pride of their own independence to sustain every requirement of good health, and plenty, in peace—or war.

THE ESTIMATION OF FAT.[1]

By HELMAN ROSENTHAL and P. F. TROWBRIDGE,

From the Department of Agricultural Chemistry of the University of Missouri, Columbia.

In the course of the nutrition investigations in this laboratory we have occasion to make a great many estimations of fat in samples of portions of animals and in feeding stuffs. The usual Soxhlet extraction of the thoroughly-dried sample with ether is the method that has been employed. It is understood that this method gives a determination of the crude fat or total ether-soluble material. By the Soxhlet extraction of dried blood we have been unable to find any ether-soluble substances. It has been very difficult to obtain concordant results with such material as brain, liver, and bran, and it has been found that sixteen hours' extraction of these substances would not remove all the ether-soluble material. A reëxtraction frequently adds a very appreciable amount of crude fat. It is because of these difficulties that we have investigated the methods proposed for accurate fat estimation in the hope that we could find a method that would give a true determination of the fat present, and at the same time permit application in a laboratory where a great many determinations must be made.

Kumagawa and Suto [2] have made a study of the general methods of fat estimation. The methods proposed by Rosenfeld, by Dormeyer, and by Glickin are also extraction methods, and therefore are no more accurate than the regular Soxhlet method. Kumagawa and Suto saponify the fat with 5N sodium hydroxide solution. They transfer the soap to a separatory funnel and acidify with a mineral acid. The fatty acids are shaken out with ether, the ethereal solution is evaporated to dryness, taken up with ether, and filtered through asbestos. The filtrate, after being dried, is taken up with petroleum ether and again filtered. The filtrate is evaporated and dried to constant weight. The residue is taken up with petroleum ether and treated with alcoholic potash. The petroleum ether is removed and the alcoholic solution is again shaken with petroleum ether. These combined ether extracts are evaporated and taken up with a little alcoholic sodium hydroxide. The solution is evaporated, dried,

[1] Reprinted from *Journal of Biological Chemistry.*

[2] M. Kumagawa and K. Suto: *Biochem Ztschr.*, iii, pp. 212–437, 1908.

extracted with petroleum ether, and filtered. The filtrate is evaporated and dried to constant weight. The weight of unsaponifiable material will give by subtraction the true amount of fatty acids which is reported as fat by multiplying by the factor 1.046. This method has been shown to give very satisfactory results on many substances, but has not worked satisfactorily with blood.

Shimidzu [3] has modified the above method for work with blood. He first extracts the blood with 95 per cent. alcohol and filters through a cloth filter. The residue is again extracted with boiling alcohol. The combined alcoholic filtrates are saponified with 5N sodium hydroxide, and the determination is continued as directed by Kumagawa-Suto. Following these directions we made several determinations of fat in cow's blood with the following results:

TABLE I.
Blood.

Weight of sample	Weight of fatty acids and unsaponifiable substances	Weight of unsaponifiable substances	Weight of fatty acids	Weight of neutral fat	Neutral fat	Time on water-bath
Grammes	*Gramme*	*Gramme*	*Gramme*	*Gramme*	*Per cent.*	*Hours*
20	0.1775	0.0813	0.0942	0.0985	0.493	¾
20	0.1785	0.0935	0.0850	0.0889	0.445	¾
20	0.1523	0.0967	0.0556	0.0582	0.291	6
10	0.0782	0.0471	0.0311	0.0325	0.325	3
9.5	0.0757	0.0353	0.0404	0.0423	0.444	4

Average of five determinations, 0.3996 per cent.
Greatest variation from average, 28 per cent.
Least variation from average, 11 per cent.

As can be seen from the above table, the results are far from satisfactory. The great difference in the results may be due to several causes. The large number of filterings may cause a considerable loss. The great amount of cholesterol and other unsaponifiable substances in the blood may cause a difficulty in separating them from the fatty acids. Furthermore, it seems almost impossible to get rid of all the coloring matter. Even after six hours' drying we were unable to obtain a colorless filtrate. Another probable source of error is the long drying on the water-bath, which may cause some of the fatty acids to become insoluble in petroleum ether.[4]

[3] Y. Shimidzu: *Ibid.*, xxviii, pp. 237–273, 1910.

[4] P. Hartley: *Jour. Physiol.*, xxxvi, p. 17, 1909; xxxviii, p. 353, 1909. It may be mentioned here that Bloor recently published a new nephelometric method for small amounts of fat in blood. This JOURNAL, xvii, p. 377, 1914.

In order to determine whether the large amount of cholesterol and other unsaponifiable substances in the blood soluble in petroleum ether has really a great deal to do with the fluctuation of results, we determined the amount of fat in the liver of the same cow from which the blood was obtained, since it is stated by Paton [5] that the liver contains only about 0.3 to 0.05 per cent. of cholesterol.

One hundred grammes of liver were saponified and made up to volume, 1000 Cc., with water; 100 Cc. aliquots representing 10 grammes of sample were then taken and analyzed.

TABLE II.
Liver.

Weight of sample	Weight of fatty acids and unsaponifiable substances	Weight of unsaponifiable substances	Weight of fatty acids	Weight of neutral fat	Neutral fat
Grammes	*Gramme*	*Gramme*	*Gramme*	*Gramme*	*Per cent.*
10	0.2125	0.0194	0.1931	0.2020	2.020
10	0.2205	0.0273	0.1934	0.2023	2.023

It is interesting to note how closely these two results agree, within 0.003 per cent. The amount of unsaponifiable substances in the liver soluble in petroleum ether is over 10 per cent. of the total amount. This close agreement, it seems to us, would indicate that the less the amount of unsaponifiable substances, the less the errors introduced, regardless of the other errors enumerated above.

TABLE III.
Clear Back Fat of Pork.

Weight of sample	Weight of fatty acids and unsaponifiable substances	Weight of unsaponifiable substances	Weight of fatty acids	Weight of neutral fat	Neutral fat
Gramme	*Gramme*	*Gramme*	*Gramme*	*Gramme*	*Per cent.*
0.2826	0.2404	0.0010	0.2394	0.2504	88.62
0.2826	0.2356	0.0009	0.2347	0.2455	86.87

We next determine the fat in a sample of fresh, clear back fat of pork. We weighed out 2.8262 grammes and added 50 Cc. of 95 per cent. alcohol, and saponified it for three hours under a reflux con-

[5] D. N. Paton: *Journ. Physiol.*, xix, p. 191, 1895–96.

denser. There was thorough saponification. The alcohol was boiled off as completely as possible. The solution was then made up to a litre of solution with water, and 100 Cc. aliquots were taken. The petroleum ether extract was perfectly colorless.

Comparison of Results by Soxhlet Extraction.

As mentioned before, no ether-soluble material was obtained by extraction of the dried blood. Twice extraction of the liver (after drying *in vacuo*) gave 2.723 per cent. of ether-soluble material. The fresh sample of clear back fat of pork was analyzed, giving moisture 7.68 per cent. and fat (ether-soluble) 90.13 per cent. It will be noted that the results obtained by the Soxhlet extraction method and the Kumagawa-Suto method do not agree.

Lieberman and Szekely [6] have proposed a method which consists in saponification of the fat, acidifying the soap with sulphuric acid. The acidified solution, in a specially-graduated flask, is shaken with petroleum ether and the flask filled to the mark with a saturated sodium chloride solution. After thorough mixing, an aliquot of the petroleum ether layer is taken, mixed with neutral alcohol, and titrated with standard alcoholic potash. Phenolphthalein is used as an indicator. The soap formed is evaporated to dryness, weighed, and the results are calculated to neutral glycerides.

In studying this method in comparison with the other methods, we tried some modifications which seemed to be advantageous, and propose the following method:

Description of Proposed Method.—The sample is heated for two hours with 30 Cc. of a 20 per cent. sodium hydroxide solution. Place the beaker in the water-bath and cover with a funnel having the stem cut off. During this saponification the mixture is stirred a few times.

The solution, while still warm, is transferred to a glass-stoppered separatory funnel of about 300 Cc. capacity. The beaker is washed out two or three times with warm water. The solution is then acidified with 35 Cc. of a 20 per cent. hydrochloric acid solution (specific gravity 1.1). After thorough cooling the contents of the separatory funnel are shaken out with ether. The combined portions of the ether solution are filtered and evaporated to dryness on the water-bath. The residue is next taken up with about 25 Cc. of fat-free

[6] L. V. Lieberman and S. Szekely: *Arch. f. d. ges. Physiol.*, lxxii, p. 360, 1898.

petroleum ether (boiling-point 30° to 50° C.), and about 10 or 15 Cc. of 95 per cent. alcohol are added. This is titrated with N/20 alkali, using about two drops of a 1 per cent. solution of phenolphthalein as indicator. The end-point is sharp and distinct.

With a sample of blood an alcohol extraction should first be made as recommended by Shimidzu.[7]

With a sample rich in fat we recommend that saponification be brought about in the presence of alcohol, using a reflux condenser to prevent loss of alcohol during boiling; after saponification the alcohol can be driven off by boiling.

The following tables give the determination of the fat in blood, liver, and clear back fat of pork by the proposed method:

TABLE IV.
Blood.

Weight of sample	No. of Cc. of 0.0400/N NaOH	Weight of NaOH	Weight of fatty acids	Weight of neutral fat	Fat
Grammes		*Gramme*	*Gramme*	*Gramme*	*Per cent.*
20	3.60	0.0072	0.0498	0.0521	0.260
20	3.50	0.0070	0.0484	0.0506	0.253
10	1.85	0.0037	0.0256	0.0268	0.268
9.5	1.78	0.0036	0.0246	0.0258	0.272

Average per cent., 0.263.
Greatest variation from average, 3.7 per cent.
Least variation from average, 0.95 per cent.

This fat determination shows very concordant results, and, although it differs from the average of five determinations of the same sample by the Shimidzu modification of the Kumagawa-Suto method, it will be noted that the greatest variation from the average is only 3.7 per cent., compared with a corresponding variation of 28 per cent. in the results from the Kumagawa-Suto method.

TABLE V.
Liver.

Weight of sample	No. of Cc. of 0.0499/N NaOH	Weight of NaOH	Weight of fatty acids	Weight of neutral fat	Fat
Grammes		*Gramme*	*Gramme*	*Gramme*	*Per cent.*
10	13.45	0.0265	0.1834	0.1918	1.918
10	13.50	0.0270	0.1842	0.1927	1.927
10	14.50	0.0290	0.2005	0.2097	2.097

Average per cent., 1.981.

[7] Shimidzu: *Loc. cit.*

TABLE VI.

Clear Back Fat of Pork.

Weight of sample	No. of Cc. of 0.0499/N NaOH	Weight of NaOH	Weight of fatty acids	Weight of neutral fat	Fat
Grammes		*Gramme*	*Gramme*	*Gramme*	*Per cent.*
0.2825	17.62	0.0352	0.2437	0.2549	90.18
0.2826	17.60	0.0351	0.2434	0.2546	90.08

Average per cent., 90.13.

TABLE VII.

Comparison of Three Methods.

Substance	Method	Fat
Blood	Soxhlet	0.000
Blood	Kumagawa-Suto	0.400
Blood	Proposed method	0.263
Liver	Soxhlet	2.722
Liver	Kumagawa-Suto	2.021
Liver	Proposed method	1.981
Back fat of pork	Soxhlet	90.13
Back fat of pork	Kumagawa-Suto	87.74
Back fat of pork	Proposed method	90.13

As can be seen from Table VII, the Soxhlet method does not compare at all favorably except when working with almost pure fat. With the blood the ether did not extract anything, while with the liver it extracted 35 per cent. of substances other than fat. This agrees with Paton (1895), who claimed that lecithin is a constant constituent of ether extract of liver. The Kumagawa-Suto method has many possibilities of error, as has been pointed out previously, and is time-consuming. The proposed method, on the other hand, is very short and by no means complicated. In titrating, a molecular weight has to be assumed. Kumagawa and Suto, in working with fats of different animal organs, claim that in the main they consist of 70 per cent. oleic acid, 20 per cent. palmitic acid, and 10 per cent. stearic acid. This proportion would give an average molecular weight of 277. The use of an arbitrary acid molecular weight of 277 cannot account for the difference in the fat in the blood from that found by the Kumagawa-Suto method, as the use of an oleic acid molecular weight of 282 would raise the average per cent. of fat in the blood to only 0.270. Similarly, in converting the acid into

neutral fat the use of the factor 1.046 can introduce no appreciable variation, as palmitic acid has a factor of 1.049, stearic a factor of 1.044, and oleic a factor of 1.045.

SUMMARY.

The estimation of fat by the use of solvent alone gives all substances soluble in the menstruum employed. Simple extraction, therefore, gives approximately true results for fat only when that is the only soluble substance present. In the back fat of the hog this is the case, and we obtained very concordant results with the Soxhlet method; but with blood and liver the results were not reliable. The Kumagawa-Suto method is difficult of manipulation, and there seem to be many possibilities of error in the separation of the unsaponifiable substances. With the method proposed this preparation is avoided. The use of the arbitrary factor does not introduce an appreciable error.

DISINFECTION.

WHAT DISINFECTANT IS THE MOST GENERALLY APPLICABLE FOR CLINICAL, SURGICAL AND SANITARY PURPOSES? [1]

BY HERBERT C. HAMILTON, Detroit, Mich.

Phenol, discovered in 1834, was at first thought to be identical with wood creosote, which at that time was regarded very highly as a disinfectant. This was proved, however, to be incorrect, and, while there were points of resemblance, there were also several properties not common to both. Beechwood creosote is less poisonous and more germicidal than phenol proper, but it is only very slightly soluble, coagulates albumins more completely, and for various other reasons is almost discredited except for a few special purposes.

The discovery by Lister (1871) that suppuration of wounds could in almost every case be prevented by use of carbolic acid gave a great impetus to its use as a germicide and antiseptic. This work was the basis of the whole modern theory and practice relating to microörganisms, not only as they apply to Lister's special field of surgery but to that of sanitation as well.

Probably no discovery in biology has been more revolutionary and

[1] Reprinted from *Therapeutic Gazette*, 1914, p. 311.

far-reaching than his, since he shares with Pasteur the honor of demonstrating the connection between microörganisms and processes of infection. Lister found carbolic acid to be exceedingly efficient, and recommended it highly because of its ready adaptability to the processes of aseptic surgery. While it is fatal in three to five per cent. solution to the vegetative forms of microbial life, it is not always effective against spores in any dilution or even in pure form except at high temperatures. However, because of retaining its effectiveness in the presence of salts, acids, alkalies, and even protein, it ranks above mercuric chloride for some purposes, although under ideal conditions the latter is many times as efficient.

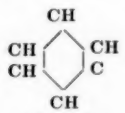
That portion of coal-tar oil which remains after phenol is removed was first recognized as having antiseptic value when it was used for pickling timber, a process patented in 1836 in England. It is still an open question what constituent of the heavy coal-tar oils is most valuable as a preservative, but its use for this purpose served to direct attention to the strongly germicidal character of certain of its constituents. A part of the oil, later known as creosote oil because of its similarity to wood creosote, was prepared as a disinfectant as early as 1874. The first preparation of importance was that known as creolin, prepared in 1887. It was analyzed, and its composition made known to the scientific world in 1889. Since that time the number of such preparations has increased enormously, and at the present time there are hundreds of the coal-tar disinfectants composed of creosote oil and soap and containing various proportions of phenols. The germicidal values of these range from that with a coefficient of 1, or about equal to pure phenol, to those of exceptional value with coefficients of 10 or more, depending on the amount and character of the phenols present.

The phenol coefficient is a term used to designate the value of a germicide. Since carbolic acid or phenol is well known as an efficient disinfectant, its value is taken as unity, and the value of any other substance similarly used can be expressed by a number called its coefficient, which indicates how many times more, or in some cases less, the disinfectant can be diluted than phenol and retain an equal germicidal value. Because of the infinite variety of combinations in coal tar, a chemical assay will not give a very accurate indication of the efficiency of an oil. Its real value can be ascertained only by actual comparison with phenol, using *B. typhosus* as the test organism, and

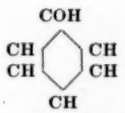
finding the dilutions of the sample which are as efficient as certain dilutions of phenol.

These phenols are so called from their resemblance to carbolic acid or phenol proper, and are more or less closely allied to it both in composition and in properties. They differ, however, in several important characteristics. With few exceptions they are liquid and will not crystallize as carbolic acid does; they are very slightly soluble in water, and require a solvent of some character to bring them into a condition in which their activity can be measured and applied; they are much less poisonous and corrosive than phenol, and are more strongly germicidal. Chemically the phenols of ordinary coal tar differ from carbolic acid in having one or more organic radicals attached to the benzol ring. The graphic formula for benzol is theoretically considered to be a hexagon, familiarly known as the benzol ring. Each angle of the hexagon is occupied by a CH group, and on this simple form thousands of organic compounds are built up by additions or substitution.

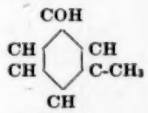
Phenol and cresol or cresylic acid are shown below in their generally accepted formulæ:



Benzol.



Phenol.



Cresol.

It is possible by synthesis to prepare derivatives still more strongly germicidal than those occurring naturally in the coal tar.

The insoluble character of the phenols and of the creosote oil containing them requires the use of an agent to be incorporated with these oils which will allow the formation of a homogeneous solution or emulsion when the product is mixed with water.

Because of the different kinds of oils used and the necessarily different treatments to prepare a substance miscible with or soluble in water, the coal-tar disinfectants differ among themselves. These differences are unimportant except from the viewpoint of efficiency, and on this basis the disinfectants may be classified into three groups:

Group 1, those with a phenol coefficient of about 2 which are soluble in soft water, to make a clear solution. Compound Solution of Cresols U. S. P. is an example of this group.

Group 2, the ordinary type of coal-tar disinfectants with coefficient of 2 to 6 which emulsify when mixed with warm, soft water.

Group 3, the high coefficient disinfectants which also emulsify when mixed with water, but which are efficient when much more highly diluted.

There are certain advantages in using these coal-tar derivatives which make them far superior to most other disinfectants. These may be summarized as follows:

Convenience.—Compared with dissolving carbolic acid crystals to make a three to five per cent. solution it is much easier to dissolve any member of these groups. Some can be dissolved in water in any proportion; any one, if properly made, can be dissolved readily to make a stronger solution than is possible to obtain with carbolic acid crystals.

Efficiency.—The members of Group 1 will dissolve readily to make a solution of any desired strength, from that of pure carbolic acid down to one that is merely antiseptic.

The members of Group 2 are more efficient—a one or two per cent. solution usually far exceeding the efficiency of the strongest solution of phenol.

The members of Group 3 are still more efficient, as their phenol coefficients indicate.

Safety.—The coal-tar disinfectants are practically neither toxic nor corrosive when diluted for use on the basis of their efficiencies.

Character of Solution.—The formula for almost all the coal-tar disinfectants is such that the solution is alkaline and soapy, which aids its penetration. There is very little if any coagulation of protein to hinder penetration and lower the efficiency.

It is evident from the above comparisons that the proper use of the coal-tar disinfectants represents a distinct advance over that of carbolic acid. Even the one factor of safety alone is sufficient reason to exclude the latter from general use.

Comparing the coal-tar disinfectants with those of the metallic salts and gaseous disinfectants, the most important point to be considered is:

Adaptability.—Sulphites and sulphurous acid and ferrous salts are strictly limited in their usefulness to such conditions where the abstraction of oxygen or water is detrimental or destructive to the life and development of bacteria, etc. Calcium hypochlorite and potassium permanganate are valuable where bacterial life is endangered by the action of oxygen, these substances being oxidizing agents either directly or indirectly. It is evident, therefore, that such sub-

stances are not generally applicable as disinfectants. For purifying water or sewage where oxidation of organic matter is as important as germicidal action the oxidizing agents are especially adapted.

Mercuric chloride, while being highly efficient under exceptional conditions, is so readily destroyed or so lowered in efficiency under ordinary conditions that it is not a dependable disinfectant. It is precipitated by protein, soap, and sulphur compounds; it is limited in its penetrating properties because of the coagulating action on albumin; it inhibits the growth and does not kill organisms after short exposures; it is exceedingly poisonous and irritating.

Formaldehyde is limited in its usefulness to its application as a gaseous disinfectant. In this field no preparation can replace it; but a solution of the gas in water applied as a liquid disinfectant is far inferior to phenol.

The comparisons made above indicate that even the ordinary coal-tar disinfectants when properly prepared are superior to phenol under all conditions, and surpass all other disinfectants aside from the purposes for which the latter are peculiarly adapted.

Recently coal-tar disinfectants of much higher efficiency have been prepared. The coefficients of some of these in fact are so high that the correctness of such statements is seriously questioned. The origin and chemical character of the oils from which these are prepared are more or less indefinite. Whether the character of the coal or the method of distillation by which the oils are produced is responsible for the high germicidal value is not generally known. That it is not produced in America might indicate that the character of the coal is at least partly responsible for the difference. The methods used in producing gases from coal for use in the steel and iron industries differ in England from those followed in America. It is a well-known fact that the temperature maintained and the presence or absence of air, during the destructive distillation, very markedly influence the character of the resulting products. In one case the benzols appear to oxidize to phenols, in another they appear to polymerize to naphthaline, anthracene, etc. This being true, it may be that still another series of compounds results from a slight difference in the conditions obtaining during this destructive process. The chemical composition has been claimed by Worrall (Rideal's "Disinfection and Disinfectants") to be such as to place them among the organic compounds that are entirely different from the phenols of coal tar.

Another writer attempts to throw a veil of mystery over them by assigning them to the class of diphenyls.

For the purpose of this article the composition and structure of those high coefficient oils are unimportant. The sanitarian is more concerned with the efficiency of the disinfectant prepared from them. Is there real value in it in proportion to the claimed efficiency? Can confidence be placed in the statement of its value when this so far exceeds that of phenol and similar disinfectants? The question may also suggest itself, How is it possible that a product less toxic and less corrosive than carbolic acid, practically harmless when diluted as it can and should be before using, is so exceptionally active that bacteria are killed in dilutions fifteen to twenty times as great as can be safely recommended for phenol?

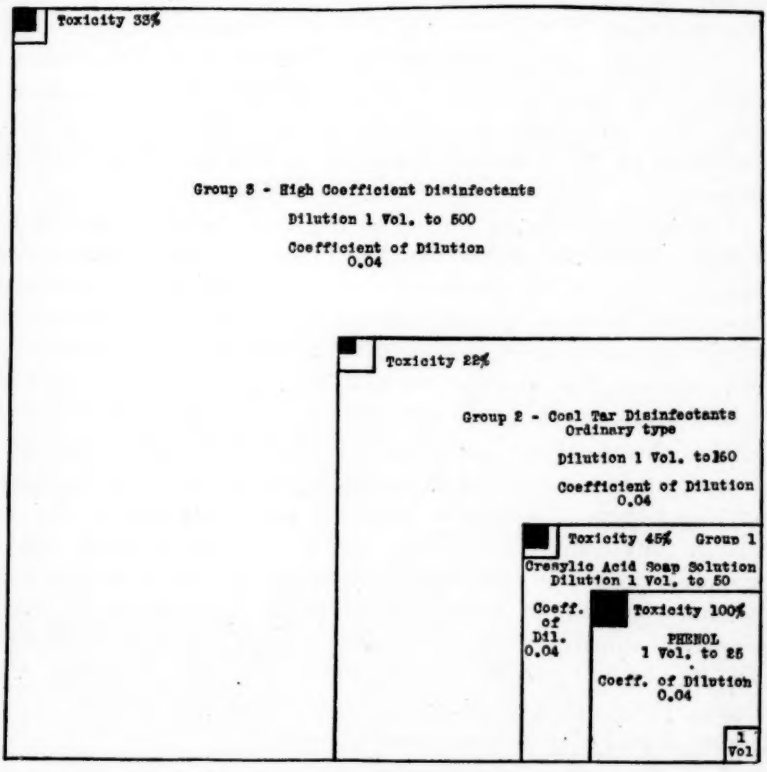
The average user of a disinfectant rarely knows from results whether it is efficient or not, because he has neither the facilities nor the skill to test it, and because incomplete disinfection or entire absence of it may not be followed by any infection directly traceable to such a failure. Even the chemist, however familiar he may be with disinfectant oils, cannot determine with certainty the efficiency of any product entirely by its chemical properties. Bacteriological rather than chemical control is, therefore, a very essential requirement for disinfectants. Hygienic measures are too vitally important to be open to suspicion regarding the substances used. The methods of applying them are so often open to question that the substances must be in the highest degree efficient.

The ideal disinfectant has been described in great detail by different authors. But the ideal disinfectant for every kind of disinfection is probably unattainable and its desirability questionable.

Formaldehyde, mercuric chloride, silver nitrate, phenol, and the coal-tar derivatives each has its sphere of usefulness, and each is more or less ideal in that sphere. Where a coal-tar derivative is applicable, however, there are certain properties possessed by this class of high coefficient disinfectants which very closely approach the ideal for general disinfection.

The average coal-tar disinfectant of Group 2 is used in a solution of one per cent., in which dilution it is about as efficient as a three to five per cent. solution of phenol. One of the disinfectants of Group 3, with a phenol coefficient of 20 when diluted to a one per cent. solution, is four times as efficient as a five per cent. solution of carbolic acid crystals. The accompanying chart is a graphic repre-

sentation of the comparative efficiencies and toxicities of representatives of the three groups. The " 1 Vol." square is shown in the lower right-hand corner, while the four larger squares show the volumes to which this one volume of phenol and of each of the three groups can be diluted, all of the dilutions having the same germicidal efficiency—a phenol coefficient of 0.04.



The toxicities are shown graphically by the square in the upper left-hand corners of the four squares representing the dilutions. Phenol, being used as a standard, is entirely black, while the others are blackened in proportion to their toxicities, expressed in per cent. of that of phenol. The ratio of the black " toxicity " square is a graphic representation of the non-toxic character of these dilutions compared to that of phenol. For example, Group 3 with a toxicity of thirty-three per cent. has a black square one-third as large as that

for phenol; a comparison of the two toxicities with their corresponding dilutions shows that a solution of phenol is sixty times as toxic as a member of Group 3 diluted to an equal efficiency.

The coagulative action and the caustic and corrosive properties of the three groups can be only roughly measured; these seem, however, to be very closely associated with toxicity. So the practically harmless nature of Groups 2 and 3—particularly the latter—is evident from the chart.

Instruments are not corroded, nor is there any irritation to the healthy skin, when immersed in such a solution. The mucous membrane, however, being more sensitive will tingle and smart from application of this solution because of its alkaline and penetrating character.

Coal-tar disinfectants in general are, like phenol, unaffected by alkalies. While their values are diminished by organic matter more than is phenol, this is apparently a slower action rather than actual lowered efficiency, since there is almost no coagulation of the organic matter. In this case the fact that the disinfectant is in emulsified form explains its slow action, because necessarily the minute globules of oil composing the emulsion require a more prolonged period to penetrate moist organic matter, which tends to retard penetration.

Acids do not destroy but do materially impair the value of emulsified disinfectants in which the vehicle is soap. The same is true of hard or salty water. It is easier, however, to correct these waters or replace them with soft water with which to dilute a disinfectant than to replace soap by any other emulsifier of equal efficiency. Soap has several valuable properties in addition to that of being an efficient emulsifier of coal-tar oils. It is cleansing and tends to dissolve the natural, protective, greasy coating on the skin and other surfaces. It is not devoid of germicidal action in itself.

As a deodorant a coal-tar disinfectant has an action tending to absorb, remove, and replace bad odors. Its real value, however, is to destroy the putrefactive bacteria producing the odors—the only property which makes a deodorant of real value.

An emulsified disinfectant has been proved to exceed a soluble disinfectant even if the same constituents and the same proportion were present in each. This is shown to be due to a concentration of the minute globules of oily emulsion around the bacteria, the results being equivalent to those from a considerably stronger solution in

which no minute globules of oil are present, but all is in uniform solution.

To summarize, a high coefficient disinfectant of the third group is less likely to be destroyed or inhibited in its action and is more generally applicable than the gaseous disinfectants, the oxidizing and reducing agents, or the toxic and protein-coagulating agents.

When diluted to make a solution equivalent to a three or five per cent. solution of phenol, it is

Non-toxic,
Non-corrosive to metals,
Non-coagulative to tissues,
Not caustic to the skin,
Not affected by alkalies,
Not destroyed by acids,
Not oxidized nor reduced by organic matter.
An efficient germicide.
At minimum cost per unit of efficiency.

It is not merely a substitute for carbolic acid; it is a new material possessing not only all the advantages of this valuable substance, but many others in addition. Why should the physician or the surgeon continue to use carbolic acid?

Research Laboratory,
Parke, Davis & Co.

BOOK REVIEWS.

Erstes Mikroskopisches Praktikum. Eine Einfuhrung in den Gebrauch des Mikroskopes und in die Anatomie der höheren Pflanzen. Von Dr. Arthur Meyer, Universität Marburg. Jena: Gustav Fischer, 1915.

This is the third edition of Meyer's "Praktikum," which has come to be recognized as of fundamental importance to the student in the study of the anatomy of higher plants. There is very apt to be a somewhat superficial consideration given in most courses in botany on the basic principles concerning the use of the microscope. In this particular Meyer's work is unique, and at the outset gives the student many illustrations, so that he becomes thoroughly grounded in the correct interpretation of the objects which he is viewing under the microscope. Likewise in the use of reagents, the microtome, and staining technique there is considerable detail which is of value to the

student. The consideration of the material is in systematic manner, beginning with simple materials as pollen grains, filamentous algæ, starch grains, leading up finally to the more intricate work in cytology. This is as it should be, and, really, before the student is prepared to study in detail the nucleus he should have a pretty thorough training in the more apparent products of the cell as well as the structure of tissues. Meyer's book is without question among the best for the beginner in scientific biology. Its value is increased by the comprehensive citation to the literature.

ALLEGEMEINE BAKTERIOLOGIE UND STERILISATIONSLEHRE für Ärzte und Pharmazeuten. Von Dr. K. Laubenheimer, Universität Heidelberg. Jena: Gustav Fischer, 1915.

A most excellent book on the methods of study of the morphology and biology of the lower microörganisms. It is succinct, yet very comprehensive, and well illustrated with five plates in colors. While written for the uses of physicians and pharmacists, it will be found useful in any course of bacteriology. The work is divided into three parts. In Part I there is a general treatment of the morphology and biology of bacteria, yeasts, and moulds and the general consideration of their chemistry and physiology, together with the discussion of toxins, infection, immunity, and natural resistance. Here also are discussed the methods of serum diagnosis, and there is an excellent presentation of Ehrlich's side-chain theory. In Part II are considered the mechanical and optical principles of the microscope and its use in the examination of bacteria and the individual study of them. Part III is devoted to the study of the methods of sterilization and their application to practice. Every phase of bacteriological work is considered, and we have not seen any work which presents the subject in such a clear and readable manner and at the same time in such a broad and scientific spirit.

ANNALES DU MUSEE COLONIAL DE MARSEILLE fondees en 1893 par Dr. Edouard Heckel, et publiees sous sa direction. Vingt-deuxieme annee. 3^{e} serie, 2^{e} volume (1914). Marseille Musee Colonial 5, Rue Noailles, 5, 1914.

This volume contains three excellent monographs: 1, on "The Genus Terminalia," by P. Megenc; 2, on a "New Contribution to the Study of the Crassulaceæ," by Raymond-Hamet and Perrier; 3, "A Biological Study of the Asclepiadaceæ of Madagascar," by Pierre Choux.

These contributions are of the same high order that we are accustomed to see in these volumes, and are highly appreciated by systematic botanists and students of morphological botany. Each monograph is beautifully illustrated and contains a rather comprehensive bibliographical index.

E. Merck's Annual Report of Recent Advances in Pharmaceutical Chemistry and Therapeutics. 1913: volume xxvii. E. Merck, Chemical Works, Darmstadt, 1914.

This volume continues to be a veritable *vade mecum* of information concerning medicinal substances. In the present volume, following the precedent already established, there are 2 extended monographs, the one on nuclein and nucleinic acid, and the other on preparations used for radiographic examination. There are nearly 500 pages devoted to the consideration of preparations and drugs, which are greatly enhanced by the addition of a General Index, Index of Diseases, Symptoms and Indications for Treatment, Index of Authors, and a Bibliographical Index.

Annals of the Missouri Botanical Garden, Anniversary Proceedings. St. Louis, Mo., 1915.

This volume contains an historical account of the Missouri Botanical Gardens and an appreciation of the founder, Henry A. Shaw. It also contains the complete papers which were read by eminent botanists who attended the celebration on October 15 and 16, 1914. The papers are of an unusually high order of merit and of very great interest. They include "The Vegetation of Mona Island," by N. L. Britton; "The Flora of Norway and its Immigration," by N. Wille; "The Phylogenetic Taxonomy of Flowering Plants," by C. E. Bessey; "The Botanical Garden of Oaxaca," by C. Conzatti; "The Origin of Monocotyledony," by J. M. Coulter; "The History and Functions of Botanic Gardens," by A. W. Hill; "Recent Investigations on the Protoplasm of Plant Cells and its Colloidal Properties," by F. Czapek; "The Experimental Modification of Germ-plasm," by D. T. MacDougal; "The Relations between Scientific Botany and Phytopathology," by O. Appel; "The Law of Temperature Connected with the Distribution of the Marine Algæ," by W. A. Setchell; "Phytopathology in the Tropics," by Johanna Westerdijk; "Phylogeny and Relationships in the Ascomycetes," by G. F. Atkinson, and "A Conspectus of Bacterial Diseases of Plants," by E. F. Smith.

PERFUMES AND COSMETICS, their Preparation and Manufacture. A complete and practical treatise, containing complete directions and formulas for making handkerchief perfumes, smelling salts, sachets, fumigating pastils, cosmetics, hair dyes, and all toilet preparations. By George William Askinson. Translated from the German. Revised with additions by W. L. Dudley and a corps of experts. Illustrated by thirty-two engravings. Fourth edition. New York: The Norman W. Henley Publishing Company, 132 Nassau Street, 1915. Price, $5.

The object of this book is to furnish the reader with data necessary for carrying out reasonably reliable processes for preparing the most generally approved simple and compound perfumes, and give him such accurate information concerning the origin and properties of the various ingredients as will be needed for his purposes, together with practical hints to enable him to detect adulterations and frauds.

The book is interesting and will no doubt be of value to those who are especially interested in the study of perfumes and the manufacture of their preparations.

THE SPATULA SODA WATER GUIDE AND FOR SODA WATER DISPENSERS. By E. F. White. Fourth Edition. Boston, Mass.: Spatula Publishing Company. Price, $1.

This work may be considered to be a complete compilation of valuable formulas and information for the manufacture of carbonated waters, fountain supplies, and ice cream, together with instructions for the dispensing of all kinds of carbonated drinks and sundæs, the compounding of syrups and ice-cream dressings, etc., giving accurate instructions for the serving of all the leading drinks and sundæs in the best and most attractive manner known, and for the management of the luncheonette. This is probably the best book on the subject published, and will be found useful to the pharmacist in connection with his soda fountain.

CORRESPONDENCE.

ADVANCED INSTRUCTION IN PHARMACY.

The Philadelphia College of Pharmacy has established a two-year course in pharmacy, leading to the degree of Graduate in Pharmacy (Ph.G.), to begin September 20, 1915. Each year will extend over

thirty-one weeks and cover at least 1500 hours of instruction, which is 25 per cent. more than the number of hours required by the American Conference. The entrance requirement is the completion of at least one year of high-school instruction or its equivalent (15 counts).

The three-year course will be continued, leading to the degree of Doctor of Pharmacy (Phar.D.). Thirty-one weeks of instruction will be given each year. The entrance requirements for this course will be four years of completed high-school work or its equivalent (60 counts). This course will embrace both laboratory work and didactic instruction of an advanced character, with the laboratory work predominating.

In the two-year course, commercial pharmacy will be treated more extensively than heretofore. This College has conducted a compulsory course in this branch for fifteen years, and many new features have been added to meet the demand from all parts of the country for a pharmacist with better business equipment.

In the professional education the standards will not be relaxed.

In the third year, students will be given advance instruction in analytical chemistry, pharmacognosy and botany, bacteriology, food analysis, manufacturing pharmacy, biological assays, jurisprudence, etc.

A course in chemistry and pharmacy, leading to the degree of Bachelor of Science in Chemistry and Pharmacy (B.Sc.), will extend over four years of thirty-one weeks each. The entrance requirements for this course are the same as for the degree of Doctor of Pharmacy, and it includes advanced work in chemistry, technical microscopy, and bacteriology, and is designed especially for the education of analysts and food and drug chemists.

JOSEPH P. REMINGTON,
Dean.

THE DETERMINATION OF SMALL QUANTITIES OF HYDROCYANIC ACID.

June 11, 1915.

To the Editor:

In the article "On the Determination of Small Quantities of Hydrocyanic Acid," printed in the June issue of THE AMERICAN JOURNAL OF PHARMACY, there is a misprint in the conclusions wherein it is stated that the presence of potassium chloride in the liquid to be tested has proved to be of great advantage. The salt

mentioned in our original paper is potassium fluoride, which salt we found to have a remarkable effect on the formation and color of the Prussian blue. Potassium chloride, however, prevents the formation of a pure blue color and renders the test less delicate. We would, therefore, appreciate very much if you would make a correction in an early issue.

A. VIEHOEVER,
C. O. JOHNS.

DRUG PLANTS NOT USUALLY PROFITABLE.

Although a large amount of money is spent annually for the importations of crude drugs, and the extermination of a number of valuable native drug plants is threatened, government specialists do not believe that the growing of drug plants offers any unusual opportunities for profit to the American farmer. Drug plants are subject to the same diseases and risks as other crops, and, in addition, knowledge of the best methods of cultivation and handling is less general than in the case of other and better known crops. In issuing a new bulletin, Farmers' Bulletin 663, "Drug Plants Under Cultivation," the Department of Agriculture, therefore, warns farmers that in order to have the cultivation of drug plants financially successful in this country the introduction of improved methods and the extensive use of machinery is probably necessary. Under these circumstances the natural tendency will be to increase the production in the interest of economy. The demand for many drug plants, however, is so limited that if large areas are brought under cultivation there is considerable danger of overproduction. Prospective growers are urged, therefore, to acquaint themselves with market conditions before investing any considerable sum of money in this way.

On the other hand, the number of drug plants which may be grown in the United States is large. Many native medicinal plants which are found in their wild state in a few sections have been successfully cultivated in situations far beyond their natural range. In suitable soil and under favorable weather conditions the following plants have done well under cultivation in numerous places in the Central and Eastern States, and, if the difference in climatic conditions is not too great, will probably be suitable in other regions:

Anise, belladonna, burdock, caraway, catnip, camomile, conium,

coriander, digitalis, dill, echinacea, elecampane, fennel, henbane, horehound, pennyroyal, sage, stramonium, tansy, thyme.

The bulletin already mentioned contains specific instructions for the cultivation of each of these plants and of a number of others. In general, it may be said that many wild medicinal plants are much more difficult to propagate from seeds than species commonly grown in gardens. Moreover, in growing medicinal plants from seed it is much better to start the plants in a green-house or hot-bed than to sow the seed directly in the field. Under any circumstances, the preparation of the soil is of prime importance. A seed bed prepared by thoroughly mixing equal parts of garden soil, leaf mould, well-rotted manure, and clean sand will be suitable for the germination of most seed. The heavier the soil the greater the quantity of seed should be.

Drug plants grown for their roots are usually harvested in the fall or early in the spring while the plant is still dormant. Roots collected during the growing season often shrink excessively in drying, which in all cases must be thoroughly done. Large roots are usually split or sliced, spread in thin layers on clean floors, and stirred or turned frequently. The process of drying may take several weeks, although the time can be reduced by the use of artificial heat. Good ventilation is an essential in order that the moisture driven off from the roots may be allowed to escape.

Leaves and herbs are usually harvested when the plants are in flower. Picking by hand in the field is a slow process, and the entire plant is, therefore, often cut and the leaves stripped after the plants have been brought in. Flowers may be gathered either by hand, which is a laborious method, or by devices similar to a cranberry scoop or a seed stripper.

In addition to the care and knowledge needed for the production of these medicinal plants, the grower must be familiar with market conditions. In many cases there is no local market for the product, and the grower should then send samples to dealers in crude drugs or the manufacturers of medicinal preparations in order to obtain a price for his crop. Some gowers who have been careful to maintain a very high quality in their product have succeeded in building up a trade at a price a little above the prevailing market quotations. It is also possible to secure a contract for the sale of the entire crop in advance, thus insuring a definite market.

In general, the bulletin says, the growing of drug plants in this country seems to be more suitable to well-equipped cultivators who devote themselves entirely to it than to the general farmer who looks upon it only as a minor source of income.

PHILADELPHIA COLLEGE OF PHARMACY.

NINETY-FOURTH ANNUAL COMMENCEMENT.

The exercises in connection with Commencement week of the Philadelphia College of Pharmacy were inaugurated with Baccalaureate services at the Church of St. Luke and the Epiphany on Sunday, June 6. The services were especially arranged and conducted by Rev. Dr. David M. Steele, who delivered the sermon. On Monday, June 7, the Faculty gave a supper in the College Auditorium to the members of the graduating class. Tuesday and Wednesday were devoted to Alumni functions, which were concluded with an Alumni banquet given at the Hotel Walton, and which was attended by over two hundred members.

The Commencement exercises were held on Thursday evening, June 10, at the American Academy of Music, when the diplomas and prizes were awarded to the members of the graduating class. The opening prayer was made by Rev. Floyd W. Tomkins, and an address was delivered by Col. Henry C. Demming. The degrees were conferred by President Howard B. French upon the following:

DEGREE OF MASTER IN PHARMACY (HONORIS CAUSA).

William L. Cliffe, Philadelphia, Pa.
Eugene G. Eberle, Dallas, Texas.
Caswell A. Mayo, New York.
Henry M. Whelpley, St. Louis, Mo.
William Mittelbach, St. Louis, Mo.

The following are the names of those receiving the degree of Doctor in Pharmacy (P.D.), together with the subjects of their graduating theses:

Name	Thesis	
Abrahamson, Aaron Moses	Citric Acid	Pennsylvania
Aguiar, Carlos Maria	Powdered Extracts of Belladonna and Stramonium	Porto Rico
Aguizy, Ahmed Mahmound El.	Ancient and Modern Pharmacy and Medicine in Egypt	Egypt

Name	Thesis	
Alacan, Miss Silvia Clotilde	Histology and Microscopical Study of Coffee and Distribution of Caffeine	Cuba
Avis, Clinton Fisk	The Manufacture and Use of Silk Bolting Cloth	New Jersey
Biddleman, Harold Romayne	Anthracite Coal	Pennsylvania
Bright, Jay William	Spiritus Ætheris Nitrosi	Pennsylvania
Briner, Earl Raymond	Modern Pharmacy	Pennsylvania
Brown, Bernice Berry, Ph.G.	Syrup of Krameria	Texas
Brozeitis, Miss Estella Elizabeth, Ph.G.	Absorbent Cotton	Pennsylvania
Burton, Edward Thomas, Jr.	Sulphur and Its Uses	Virginia
Carmody, Martin Francis	The Recovery of Material from Pharmaceutical Preparations	New York
Clark, Earl Daniel	Pepsin and Its Preparations	Pennsylvania
Close, Paul	Magnesia Magma	Pennsylvania
Conrow, Charles Mervin	Terpin Hydrate	New Jersey
Costello, Miss Catherine Elizabeth	Strophanthus	Pennsylvania
Creep, Parker Bare	Bacterin, Serobacterin and Serum Therapy	Pennsylvania
Deaver, Ralph Bernard	Sperm Oil	New Jersey
Decker, Henry Bristol	Bouillon Titration	New Jersey
Eaton, Lewis Hayden	Ichthyol—Its Substitutes and Uses	New York
Elward, Joseph Francis, P.C.	Extemporaneous Emulsions	Pennsylvania
Everlockner, Charles Brewin	Industrial Alcohol	New Jersey
Ferry, Miss Fanny, P.C.	The Size of Globules in Various Emulsions	Pennsylvania
Fox, Elmer Delmire	A Palatable Emulsion of Cod Liver Oil	Pennsylvania
Fox, Joseph	Salicylic Acid and Its Uses	Pennsylvania
Fredericks, Lewis Armstrong	Why Home Culture of Drugs Should be Advocated	Pennsylvania
Fuss, Ivan Ralph	Emulsion of Olive Oil	Michigan
Gable, Walter Emanuel	Modern Pharmacy	Pennsylvania
Gershenfeld, Louis	Ergot	Pennsylvania
Gibney, Raymond George	Deterioration of Official Syrups	Pennsylvania
Greenberg, Leonard Edward	Milk Adulteration	Pennsylvania
Grube, Ralph	Petrolatum Liquidum	Pennsylvania
Haase, William Frederick, Jr.	Diatomaceous Earth	Pennsylvania
Harer, Charles Raymond	Glue	Pennsylvania
Henry, Clarence Augustine Adams	Mistura Glycyrrhizæ Composita	Pennsylvania
Heymann William John	Hydrastis Canadensis	Pennsylvania
Hite, Earle Milton	Theories of Immunity and of Bacterin Therapy	Pennsylvania

Name	Thesis	
Hodgkins, James Henry	Arrangement and Preservation of Stock	Pennsylvania
Hoffman, Miss Eleanor Grace	Digitalis	Pennsylvania
Hoffman, John Henry	Pyro-analysis of Crude Drugs	Pennsylvania
Huber, Arnold Hoffman	Sapo Mollis	Pennsylvania
Israel, Joshua	Microphotography	Pennsylvania
Jackson, Charles Edwin	Economy as a Fine Art to the Student	Pennsylvania
Jones, Elwyn	Pharmacy as a Lost Art	Pennsylvania
Kephart, James Watson	Tinctura Iodi	Pennsylvania
King, Frank Martin	White Portland Cement	Pennsylvania
Kitzmiller, Dixon George, Jr.	The Suspension and Use of Mineral Oils	Pennsylvania
Klucher, Paul Edgar	Cascara Sagrada	Pennsylvania
Kohnle, William Charles	The Utilization of the Cotton Stalk in the Manufacture of Paper Pulp	Pennsylvania
Koller, William Sides	Microscopical Characteristics of Hyoscyamus	Pennsylvania
LaDow, Claude Spencer	Ichthyol	Pennsylvania
Lander, Mehnert	Mel	Pennsylvania
Latta, Eugene Stanton	Leather	New York
Lenhart, Clarence Milton, P.C.	Liquid Soaps	Pennsylvania
Loehle, Frank Aloysius	Fertilizers	Pennsylvania
Lulie, George	Philadelphia Sewerage Disposal Plant	Pennsylvania
McCloskey, Sharon Tyndale	Modified Gutzeit's Test for Arsenic	Pennsylvania
Magowan, James Harry	The Manufacture of Glass	Pennsylvania
Miceli, Leonardo Antonio	Alcohol and Its Uses	Pennsylvania
Moyer, Charles Franklin	Hairs of Rhus Glabra and Rhus Typhina	Pennsylvania
Myer, Edward Vincent	Potassium Hydroxide	Pennsylvania
Myers, Robert Lester	Prescription Precipitation	Pennsylvania
Nelson, William Edgar	Oleomargarine	Pennsylvania
Pennock, Charles Adrian	Salesmanship	Pennsylvania
Pepper, Charles William	Sterilization	Pennsylvania
Phillips, Earle Charles	Ampoules	Maine
Potterfield, Garland Blair	The Relation Between Phenol Content and Germicidal Power	West Va.
Reddon, Frank Jerome	The Behavior of Starch Toward Certain Reagents	Pennsylvania
Rupert, Vaughn Ross	Pasteurization of Milk	Pennsylvania
Samsel, George Woodward	The Tanning Industry	Pennsylvania
Samuels, Bernard	Coloration of Suprarenin Solutions	Pennsylvania
Saylor, Wesley Melvin	The Standardization of Drugs by the Use of Plants	Indiana

Name	Thesis	
Scheffey, Lewis Cass	Pollen Grains in Relation to Hay Fever	Pennsylvania
Schofield, Miss H. Edith M.	Greaseless Cold Creams	Pennsylvania
Schollenberger, William Watts	Legislation Versus Habit-forming Drugs	Pennsylvania
Siegel, Philip, P.C.	Precipitates in Alkaloidal Tinctures	Colorado
Smith, Harry Lanich	Petrolatum Liquidum	Pennsylvania
Soyles, James Samuel	Sodium Chloride	Maryland
Spangler, Chester Arthur	Drug Store Efficiency	Pennsylvania
Spargo, Stephen Treverton	Bituminous Coal	Pennsylvania
Stiles, Henry Horace	Tooth Powders	New Jersey
Stewart, Robert James	Bichloride of Mercury	Pennsylvania
Stouffer, Harvey E.	Disinfectants as a Profitable Side Line for the Retail Pharmacist	Pennsylvania
Suminsby, Carroll Burrill	Pathological Stains	Maine
Tenney, William Randolph	Hamamelis	Maryland
Thomas, John	Latex of Wahoo	Pennsylvania
Tomlin, Charles Isaac	Petrolatum	New Jersey
Trethewey, Samuel Aaron	Theobroma Cacao	Pennsylvania
Wagner, Harry David	The Dispensing of Prescriptions	Pennsylvania
Weinberg, Miss Esther	Rubber and Its Utility in Pharmacy	Pennsylvania
Weiner, Albert Maurice	Santonica as Found on the Market	Pennsylvania
Whitmire, Harry Randolph	Tanning of Sole Leather by the Liquor Process	Pennsylvania
Wilder, Joseph Livingston	Vanilla Extract	Pennsylvania
Witman, David Boyer	Santonica	Pennsylvania
Wolfe, Gaile Edgar	Hydrastis Canadensis	Ohio

The following are the names of those graduates who received the degree of Pharmaceutical Chemist (P.C.), together with the subject of their theses:

Name	Thesis	
Elmer, Walter	The Assay of Milk of Magnesia	New Jersey
Hawk, Asher Miller	Magma Bismuthi	Pennsylvania
Jordan, Herbert Victor	Sugar	Pennsylvania
Knauss, Niles Amadus	Soft Soap from Cotton Seed Oil	Pennsylvania
Levy, Robert Allen	The Venereal Diseases and Their Relation to Public Health	Pennsylvania
Ligan, Robert Franklin	The Steel Industry	Pennsylvania
Merner, Paul Marcus Pfeiffer	Liquor Potassii Arsenitis	Iowa
Miller, Thomas Gilbert	Serpentaria	Pennsylvania
Rigg, Mark	Cotton Culture	New Jersey
Ruddy, Gerald John	The Cultivation of American Ginseng	Pennsylvania

Name	Thesis	
Scher, Walter Raymond.....	Compound Elixir of Glycerophosphates	Pennsylvania
Silva, Charles Romey.....	Essential Oils from a Practical Point of View	Pennsylvania
Snyder, William Henry.....	Production of Industrial Alcohol.	Pennsylvania
Werkheiser, Harold Edwin....	Paraffin	Pennsylvania

Certificates of Proficiency in Chemistry were awarded the following:

Robert Truman Beardsley, John Brady Evans, Lloyd Philip Greisemer, P.D., Thomas Danforth Hughes, Paul S. Rodgers, Joseph Stein and Archibald Wolever, all of Pennsylvania.

Certificates in Bacteriology were awarded the following:

Norman L. Force, Jacob Edison Good, Gilbert Leon Harvey, John Harry Hayes, P.D., Howard Jonathan Koch, P.D., Robert Franklin Ligan, Henry Lischer, George Lulie, Martin Lester Messinger, P.D., Lloyd Harry Patten, Leroy Ludwig Pennypacker, James Walter Shaffer, Guy Warren Showers, Harry Lanich Smith, Jay A. Smith, Elmer Milton Weidner, Harry Randolph Whitmire and William Henry Woodring.

Award of Prizes.

The Martin Cup, awarded to the graduating class obtaining a higher average than the one immediately preceding it, was awarded to the class of 1915.

"The Graduate 1913" Cup, awarded to the Freshman class for high general record in scholarship, was awarded to the class of 1917, it having been held previously by the class of 1916.

The grade of distinguished was obtained by William Frederick Hasse, Jr. The following attained the grade of meritorious: Louis Gershenfeld, Eleanor G. Hoffman, Wesley M. Saylor, and Lewis C. Scheffey.

The Procter Prize, a gold medal and certificate, for the highest general average of the class with a meritorious thesis, was awarded to William F. Haase, Jr., the presentation being made by President French.

The William B. Webb Memorial Prize, a gold medal and certificate, offered for the highest general average in the branches of Committee, Operative Pharmacy and Specimens, was awarded to Lewis C. Scheffey, the presentation being made by Vice-president Lemberger. The following graduates received honorable mention in connection therewith: Walter Elmer, William F. Haase, Jr., James W. Kephart, and William R. Tenney.

The Chemistry Prize, $25, offered by Prof. Samuel P. Sadtler, for knowledge of Quantitative Chemical Analysis, was awarded to Garland B. Potterfield, the presentation being made by Professor Stroup.

The Materia Medica Prize, $25, offered by Prof. Clement B. Lowe, for the best examination in Materia Medica, and in recognition of Materia Medica Specimens with a meritorious thesis, was awarded to William F. Haase, Jr. The following graduates received honorable mention in connection therewith: Mehnert Lander, Paul M. P. Merner.

The Microscopical Research Prize, a compound microscope, offered by Prof. Henry Kraemer, for the most meritorious thesis involving original microscopic work, was awarded to William F. Haase, Jr. The following graduates received honorable mention in connection therewith: Silvia C. Alacan, Catherine E. Costello, Eleanor G. Hoffman, Charles F. Moyer, Frank J. Reddon, Lewis C. Scheffey, and Wesley M. Saylor.

The Analytical Chemistry Prize, $25, offered by Prof. Frank X. Moerk, for the best work in Qualitative and Quantitative Analysis, was awarded to Wesley M. Saylor, the presentation being made by George M. Beringer. The following students received honorable mention in connection therewith: Catherine E. Costello, Louis Gershenfeld, Eleanor G. Hoffman, and William R. Tenney.

The Operative Pharmacy Prize, $20 in gold, offered by Prof. Joseph P. Remington, for the best examination in Operative Pharmacy, was awarded to Walter Elmer. The following graduates received honorable mention in connection therewith: Silvia C. Alacan, Charles B. Everlockner, William F. Haase, Jr., Charles R. Harer, Earl M. Hite, Thomas G. Miller, Charles F. Moyer, Charles A. Pennock, Earle C. Phillips, Mark Rigg, Vaughan R. Rupert, Charles W. Samsel, Lewis C. Scheffey, and William Randolph Tenney.

The Maisch Botany Prize, $20 in gold, offered by Mr. Joseph Jacobs, of Atlanta, Ga., for the best Hebarium Collection of Plants, was awarded to Charles F. Moyer, the presentation being made by Dr. A. W. Miller. Silvia C. Alacan received honorable mention in connection with this prize.

The Mahlon N. Kline Theoretical Pharmacy Prize, a Troemner agate prescription balance, for the best examination in Theory and Practice for Pharmacy, was awarded to William F. Haase, Jr., the presentation being made by Mr. Clarence M. Kline. The following

students received honorable mention in connection therewith: Ahmed M. E. Aguizy, Walter Elmer, Asher M. Hawk, Lewis C. Scheffey, Harold E. Werkheiser.

The Commercial Pharmacy Prize, $20 in gold, offered by Prof. Joseph P. Remington to the graduate who passed the best examination in Commercial Pharmacy at the final examination for the degree, was awarded to Lewis C. Scheffey, the presentation being made by Mr. E. Fullerton Cook. The following students received honorable mention in connection therewith: Walter Elmer, Louis Gershenfeld, William F. Haase, Jr., Asher M. Hawk, Eleanor G. Hoffman, James W. Kephart, Mehnert Lander, Thomas G. Miller, Garland B. Potterfield and William R. Tenney.

The Instructors' Prize, $20, offered by the Instructors of the College, for the highest term average in the branches of Pharmacy, Chemistry and Materia Medica, was awarded to Louis Gershenfeld, the presentation being made by Dr. Alfred Heineberg. The following students received honorable mention in connection therewith: Clinton F. Avis, Lewis Eaton, Walter Elmer, Leonard E. Greenberg, Eleanor G. Hoffman, Frank M. King, Mehnert Lander, Robert F. Ligan, Paul M. P. Merner, and William R. Tenney.

The Pharmacy Review Prize, one year's membership in the American Pharmaceutical Association, offered by Prof. Charles H. LaWall, for the best term work in Theory and Practice of Pharmacy, was awarded to Louis Gershenfeld. The following students received honorable mention in connection therewith: Clinton F. Avis, Lewis Eaton, Leonard E. Greenberg, and Charles R. Harer.

The Kappa Psi Fraternity Prize, a gold medal, offered by the Eta Chapter of the Kappa Psi Fraternity to the graduate making the highest general average during the senior year at the College, was awarded to William F. Haase, Jr., the presentation being made by Prof. Kraemer. The following students received honorable mention in connection therewith: Louis Gershenfeld, Wesley M. Saylor, and William R. Tenney.

NATIONAL ASSOCIATION OF BOARDS OF PHARMACY.

The following is a report of the joint committee meeting of representatives of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties held with the Executive Committee of the N. A. B. P. in Washington, D. C.,

March 16 and 17, 1915. This report also contains an outline of the program for the coming annual joint meeting in San Francisco on August 7. The holding of the annual meetings of the Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy on dates preceding those on which the A. Ph. A. Convention is to be held, it is believed, will result in greater accomplishments for all concerned by affording members the opportunity of attending meetings of the different associations without conflict.

Chairman Burton, of the Executive Committee, called the meeting to order and announced that, according to previous arrangements, this session would be held as a joint meeting of chairmen of committees representing the American Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy, with the Executive Committee; this as a result of the appointing, at the Detroit Convention, by both the Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy, of corresponding committees of three, known by titles as follows: Committee on " Time and Place of Joint Meetings," Committee on " Program for Joint Meetings of Conference and Boards," Committee on " More Satisfactory Examination of Candidates for Graduation and Candidates for Board Certificates."

Mr. Burton then stated briefly that the object of the appointment of these committees and the calling of this joint meeting of representatives of the committees was with a view of planning for more successful joint meetings of the Conference of Pharmaceutical Faculties and the National Association of Boards of Pharmacy at the time of their annual conventions than had been held in the past.

He further stated that it was hoped that this movement would bring about a condition between members of Boards of Pharmacy and members of Schools of Pharmacy Faculties which would result mutually beneficial, and also, as indicated by the title of one of the committees, result in more thorough and suitable training and examination of the future pharmacist.

Dr. Hynson, in a few characteristic remarks, stated that he was heartily happy to be present; that a condition such as it was hoped to bring about as a result of the present movement for a closer relationship between the faculties and the boards had been one of the day dreams of his life. He stated, further, that his ideas about this subject were, fundamentally, that Boards of Pharmacy having

legal status and the care of the public should accept the responsibility, and demand, with the advice and consent of the faculties, such teaching as will meet the requirements of the boards for public protection. He felt satisfied that this endeavor to better conditions would result in great good. He also expressed himself positively that he believed the faculties would welcome the proposed coöperation.

After preliminary discussion it was voted unanimously that the meeting proceed as a joint meeting of the whole, with such business as might come before it, as indicated by titles of committees.

On motion of Dr. Hynson, seconded by Mr. Lewis, and carried, Professor Koch was elected chairman of the meeting.

On motion of Mr. Miller, H. C. Christensen was chosen secretary.

Chairman Koch called the meeting to order at 11.30 A.M.

Those present representing the Conference, on committees mentioned above, in the order given, were Professor Julius L. Koch, of the Pittsburgh College of Pharmacy; Dr. Henry P. Hynson, of the Department of Pharmacy, University of Maryland; Professor Henry Kraemer, of the Philadelphia College of Pharmacy.

Those representing the boards on these committees were H. C. Christensen, of Chicago, Ill.; W. P. Porterfield, of Fargo, N. D.; William S. Flint, of Worcester, Mass.

Members of the Executive Committee of the N. A. B. P. not on the above-mentioned committees, but present, were Chairman J. C. Burton, of Stroud, O. T.; T. A. Miller, president, of Richmond, Va.; Lawrence C. Lewis, of Tuskegee, Ala.

Chairman Koch announced that the first business to come before the meeting was with reference to fixing time and place for the annual joint meetings of the National Association of Boards of Pharmacy and the Conference of Pharmaceutical Faculties. He stated that as chairman of the Committee on "Time and Place of Meetings," representing the Conference, he might say that the subject had only been discussed in a general way by members of his committee, but that it seemed the general opinion that a great deal of good could come from joint meetings of these bodies if properly carried out. He would like, therefore, to have the subject, as to suitable dates for holding these meetings, thoroughly gone into, and invited discussion. Mr. Christensen stated that as chairman of the committee representing the Boards, with reference to the fixing

of dates for holding these meetings, he wished to say that the Executive Committee of the N. A. B. P. in a previous session had discussed quite thoroughly the matter of place and dates for the holding of the next annual meeting of the N. A. B. P.; that it seemed the unanimous opinion of the committee that, for the best interests of the association, as well as the members attending, the annual conventions of the association should be held on different dates from those on which the A. Ph. A. Conventions are held, either during the week preceding or the week following that meeting. Thursday and Friday, August the 5th and 6th of the week preceding the A. Ph. A. Convention, had been suggested, with the further suggestion that the joint meetings of the boards and faculties be held on Saturday, August 7 (the Saturday preceding the A. Ph. A. Convention). The Executive Committee, however, deferred definitely deciding on these dates in order that the matter might be brought before this session.

The advisability and advantages of holding these annual meetings on different dates from those on which the A. Ph. A. holds its meetings were thoroughly gone into. It was particularly pointed out that the holding of the meetings on dates separate from those on which the A. Ph. A. Convention is held would prove not only a great advantage to the N. A. B. P. and the Conference, but that it would also be an advantage to the A. Ph. A., in that it would permit members of these two bodies to attend and take part in the sessions of that association.

On motion made by Mr. Porterfield, seconded by Mr. Lewis, and carried, the dates for holding the next annual convention of the N. A. B. P. were fixed for Thursday and Friday, August 5 and 6, 1915, in San Francisco, Cal.

On motion of Dr. Hynson, seconded by Professor Kraemer, and carried, the date for the annual joint meetings of the National Association of Boards of Pharmacy and the American Conference of Pharmaceutical Faculties was set for Saturday, August 7, 1915, in San Francisco, Cal. (the Saturday preceding the A. Ph. A. Convention); this on condition that Professor Koch should lay the matter before the Executive Committee of the Conference of Pharmaceutical Faculties for its approval, and report its decision, before dates should be published.

At 1 o'clock P.M. the meeting adjourned, to meet again at 2.30.

IMPORTANT NOTICE.

The above-mentioned date (Saturday, August 7) was later agreed on as being satisfactory to the Conference of Pharmaceutical Faculties. It was so announced by Professor Julius A. Koch, chairman of the Executive Committee.

SECOND SESSION—THURSDAY AFTERNOON.

This second session of the joint meeting of committee members representing the boards and faculties was called to order by Chairman Koch promptly at 2.30 P.M.

The Chairman announced that he would now be pleased to hear from the representatives of the Committee on "Program for Joint Meetings" and that the outlining of a program would be in order. Dr. Hynson, as chairman of the Program Committee representing the faculties, opened the discussion, giving his ideas with reference to the arrangement of a program. Mr. Porterfield, representing the Program Committee for the boards, added further suggestions, as did also Professor Kraemer and Mr. Flint, representatives for the faculties and boards on the Committee of "More Satisfactory Examination." After a general discussion by all members, suggestions with reference to arrangement of a program were taken up and voted on, with the result that a program was outlined as follows:

PROGRAM

For Joint Meetings of
The National Association of Boards of Pharmacy
and
The American Conference of Pharmaceutical Faculties
To be held Saturday morning, August 7, 1915
(The Saturday preceding the A. Ph. A. Convention).
(Outline).

First Session.

President T. A. Miller, Presiding
Secretaries, W. A. Teeters and H. C. Christensen.

Report of the Joint Committee on Time and Place of Meeting:
Chairman of Joint Committees..H. C. Christensen and J. A. Koch
Report of the Joint Committee on Questions and Examinations,
W. S. Flint and Henry Kraemer
"Relationship of Local Boards with Local Colleges,"
Philip Asher and Burton Cassaday

Second Session.

President F. J. Wulling, Presiding.
Secretaries, H. C. Christensen and W. J. Teeters.

"More Perfect and Beneficial Relationship between The Boards and The Faculties" .....C. W. Johnson and R. H. Walker

"Prerequisite Laws: Their Benefits and Objections,"
H. H. Rusby and John Culley

"The Relationship of the Boards and the Faculties to the American Pharmaceutical Association".....President Miller and President Wulling

Business Referred to the Joint Session by the Boards or the Faculties

If found necessary or advisable, sessions may be held Saturday night, August 7, and Monday morning, August 9.

Professor Kraemer now stated that he would like to have some suggestions made with reference to the work of this committee; that he thought the work it was proposed to undertake was of great importance: so much so, that he felt the necessity of having the assistance and coöperation not only of the committee appointed by the boards, to work jointly with his committee, but also of other members of the boards and of the faculties.

Mr. Flint, chairman of the board's committee which is to work jointly with Professor Kraemer and his committee, stated that he also realized the importance of this work and the need of assistance. He hoped they might receive liberal aid in their work from all who felt able to give assistance. He called attention to the good work being done for the boards by the Advisory Examination Committee in bringing about more uniformity in board examinations. He expressed the belief that in this new work, along similar lines, they should be able to receive valuable assistance from that committee.

Mr. Christensen, as chairman of the Advisory Examination Committee, thanked Mr. Flint for the favorable reference made to the work of his committee and gave assurance of assistance and coöperation.

In accordance with Professor Kraemer's request for suggestions for outlining the work of the joint committees of the boards and faculties, represented by Mr. Flint and himself, this matter was now taken up and a general outline was agreed on. In accordance with a suggestion by Professor Kraemer, the Syllabus was gone

over and checked with reference to matters contained therein suitable for use as a guide in the preparation of proper questions for examination by boards of pharmacy. Later, in discussion, it was brought out that the general opinion of those present with reference to the usefulness of the Syllabus, in its present form, as a guide to the average member of boards of pharmacy, in the preparation of examination questions, seemed to be that it does not serve the purpose to the best advantage; that in order to do so it should be thoroughly revised, with a view of separating or designating material contained therein, in such a way as to indicate or outline the part or parts to be followed or used as a guide, in order to obtain proper scope and distribution of questions.

It was mentioned that, inasmuch as the Syllabus is an outline of a course of study from "a" to "z," necessarily questions on certain elementary portions of this outline must be eliminated in the consideration of questions suitable for use in examining a candidate for licentiate in pharmacy. The candidate may properly be considered as the finished product resulting from the taking of this prescribed course, and therefore, should not be given direct questions, on the elementary parts of such a course, but rather such questions as will, if properly answered, show his ability to apply the principles involved in these primary features directly to the work for which he is supposed to have been fitted by the study of a course such as is outlined in the Syllabus.

It was also suggested that this joint committee give careful consideration to an outline showing proper distinction to be made in the character and scope of questions to be used in examination for assistant registered pharmacists and those to be used in examination for full registered or licentiates in pharmacy.

An informal discussion followed with reference to future methods, plans, and prospects for the successful bringing about the proposed closer relationship and coördination between the Schools of Pharmacy and the Boards of Pharmacy, in which much interest and enthusiasm was shown by all present. There being no further business to come before the meeting, on motion of Mr. Porterfield, seconded by Professor Kraemer, the joint meeting of representatives of committees on conference of faculties and boards adjourned.

H. C. CHRISTENSEN,
Secretary, National Association Boards of Pharmacy.